

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
SEMICONDUCTOR ENERGY LABORATORY
CO., LTD.

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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing (day/month/year)	04.10.2005
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Applicant's or agent's file reference
00000PCT7956

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2005/011397

International filing date (day/month/year)
15.06.2005

Priority date (day/month/year)
18.06.2004

International Patent Classification (IPC) or both national classification and IPC
Int.Cl.⁷ H01L21/268, 21/20, 21/336, 29/786

Applicant
SEMICONDUCTOR ENERGY LABORATORY CO., LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Date of completion of this opinion	15.09.2005
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Name and mailing address of the ISA/JP

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**WRITEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

Int. l application No.

PCT/JP2005/011397

Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing

 - b. format of material
☐ in written format
☐ in computer readable form

 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

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Box No. IV Lack of unity of invention

1. In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:

- ☐ paid additional fees
☐ paid additional fees under protest
☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

- ☐ complied with
☒ not complied with for the following reasons:

The same or corresponding matters(A) between the inventions of claims Nos. 1-48 are "scanning the irradiation surface with a laser beam, and wherein beam intensity can be varied in accordance with a scanning direction."

However, after taking the prior art into consideration, it became apparent that the matters(A) were mentioned in a document JP 2000-340403 A (SEIKO EPSON KABUSHIKI KAISHA), 2000.12.08, the whole document, figs. 1-7. Therefore, the matters(A) makes no contribution over the prior art.

Consequently, there is no same or corresponding "special technical features" which is the expression in the PCT Rule 13.2. Therefore, there is no technical relationship between the inventions of claims Nos. [1-5], [6-12], [13-21], [22-30], [31-39] and [40-48].

The same or corresponding matters(B) between the inventions of claims Nos. 1-5 are "delivering a laser beam to semiconductor layer; scanning the semiconductor layer to a first direction with the laser beam in a first intensity; and scanning the semiconductor layer to a second direction with the laser beam in a second intensity, wherein the first intensity is larger than the second intensity."

However, after taking the prior art into consideration, it became apparent that the matters(B) were mentioned in a document JP 2000-340403 A (SEIKO EPSON KABUSHIKI KAISHA), 2000.12.08, the whole document, figs. 1-7. Therefore, the matters(B) makes no contribution over the prior art.

Consequently, there is no same or corresponding "special technical features" which is the expression in the PCT Rule 13.2. Therefore, there is no technical relationship between the inventions of claims Nos. [1, 2], [3], [4] and [5].

4. Consequently, this opinion has been established in respect of the following parts of the international application:

- ☐ all parts.
☒ the parts relating to claims Nos. 1, 2

WRITTEN OPINION OF THE
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International application No.

PCT/JP2005/011397

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>2</u>	YES
	Claims	<u>1</u>	NO
Inventive step (IS)	Claims	<u></u>	YES
	Claims	<u>1, 2</u>	NO
Industrial applicability (IA)	Claims	<u>1, 2</u>	YES
	Claims	<u></u>	NO

2. Citations and explanations

D1:JP 2000-340503 A (SEIKO EPSON KABUSHIKI KAISHA) 2000.12.08, the whole document, figs. 1-7

D2:EP 1304186 A2 (SEMICONDUCTOR ENERGY LABORATORY CO., LTD.) 2003.04.23, the whole document, figs. 1-28

D3:JP 2004-172424 A (KABUSHIKI KAISHA NIHON SEIKOUSHO) 2004.06.17, the whole document, figs. 1-19

Novelty: Concerning claims 1

The subject matters of claim 1 do not appear to involve a novelty with respect to the cited document D1.

The cited document D1 (paragraphs [0006]-[0009]) discloses a laser irradiation method comprising: delivering a laser beam to a semiconductor layer; scanning the semiconductor layer to a first direction with the laser beam in a first intensity; and scanning the semiconductor layer to a second direction with the laser beam in a second intensity, wherein the first intensity is larger than the second intensity.

Inventive Step: Concerning claims 2

The subject matters of claim 2 do not appear to involve an inventive step with respect to the cited document D1, D2 and D3.

The cited document D2 (fig. 1) and D3 (fig. 1) disclose a laser irradiation method wherein the laser beam is delivered obliquely to a semiconductor layer.

On the basis of these disclosures of D2 and D3, a person skilled in the art could easily realize a laser irradiation method comprising: delivering a laser beam to a semiconductor layer; scanning the semiconductor layer to a first direction with the laser beam in a first intensity; scanning the semiconductor layer to a second direction with the laser beam in a second intensity, wherein the first intensity is larger than the second intensity and the laser beam is delivered obliquely to a semiconductor layer.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: IV.3

The same or corresponding matters(C) between the inventions of claims Nos. 6-12 are "emitting a first laser beam; changing the first laser beam into a second laser beam through means for varying beam intensity which can vary beam intensity in accordance with a scanning direction; changing the second laser beam into a third laser beam; delivering the third laser beam to an irradiation surface; and scanning the irradiation surface with the third laser beam."

However, after taking the prior art into consideration, it became apparent that the matters(C) were mentioned in a document JP 2000-340403 A (SEIKO EPSON KABUSHIKI KAISHA), 2000.12.08, the whole document, figs. 1-7. Therefore, the matters(C) makes no contribution over the prior art.

Consequently, there is no same or corresponding "special technical features" which is the expression in the PCT Rule 13.2. Therefore, there is no technical relationship between the inventions of claims Nos. [6, 7], [8], [9], [10], [11] and [12].

The same or corresponding matters(D) between the inventions of claims Nos. 13-21 are "A laser irradiation apparatus comprising: a laser oscillator; means for varying beam intensity; and a convex lens; wherein a laser beam is incident into an irradiation surface, wherein the irradiation surface is scanned with the laser beam, and wherein beam intensity is varied in every scanning direction by the means for varying beam intensity."

However, after taking the prior art into consideration, it became apparent that the matters(D) were mentioned in a document JP 2000-340403 A (SEIKO EPSON KABUSHIKI KAISHA), 2000.12.08, the whole document, figs. 1-7 and EP 1304186 A2 (SEMICONDUCTOR ENERGY LABORATORY CO., LTD.), 2003.04.23, the whole document, figs. 1-28. Therefore, the matters(D) makes no contribution over the prior art.

Consequently, there is no same or corresponding "special technical features" which is the expression in the PCT Rule 13.2. Therefore, there is no technical relationship between the inventions of claims Nos. [13, 14], [15, 16], [17], [18], [19], [20] and [21].

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: IV.3

The same or corresponding matters(E) between the inventions of claims Nos. 22-30 are " A laser irradiation apparatus comprising: a laser oscillator; means for varying beam intensity; and a diffractive optical element; wherein a laser beam is incident into an irradiation surface, wherein the irradiation surface is scanned with the laser beam, and wherein beam intensity is varied in every scanning direction by the means for varying beam intensity."

However, after taking the prior art into consideration, it became apparent that the matters(E) were mentioned in a document JP 2000-340403 A (SEIKO EPSON KABUSHIKI KAISHA), 2000.12.08, the whole document, figs. 1-7 and EP 1304186 A2 (SEMICONDUCTOR ENERGY LABORATORY CO., LTD.), 2003.04.23, the whole document, figs. 1-28. Therefore, the matters(E) makes no contribution over the prior art.

Consequently, there is no same or corresponding "special technical features" which is the expression in the PCT Rule 13.2. Therefore, there is no technical relationship between the inventions of claims Nos. [22, 23], [24, 25], [26], [27], [28], [29] and [30].

The same or corresponding matters(F) between the inventions of claims Nos. 31-39 are " A laser irradiation apparatus comprising: a laser oscillator; means for varying beam intensity; and a convex lens; wherein a laser beam is incident obliquely into an irradiation surface, wherein the irradiation surface is scanned with the laser beam, and wherein beam intensity is varied in every scanning direction by the means for varying beam intensity."

However, after taking the prior art into consideration, it became apparent that the matters(F) were mentioned in a document JP 2000-340403 A (SEIKO EPSON KABUSHIKI KAISHA), 2000.12.08, the whole document, figs. 1-7 and EP 1304186 A2 (SEMICONDUCTOR ENERGY LABORATORY CO., LTD.), 2003.04.23, the whole document, figs. 1-28. Therefore, the matters(F) makes no contribution over the prior art.

Consequently, there is no same or corresponding "special technical features" which is the expression in the PCT Rule 13.2. Therefore, there is no technical relationship between the inventions of claims Nos. [31, 32], [33, 34], [35], [36], [37], [38] and [39].

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: IV.3

The same or corresponding matters(G) between the inventions of claims Nos. 40-48 are " A laser irradiation apparatus comprising: a laser oscillator; means for varying beam intensity; and a diffractive optical element ; wherein a laser beam is incident obliquely into an irradiation surface, wherein the irradiation surface is scanned with the laser beam, and wherein beam intensity is varied in every scanning direction by the means for varying beam intensity."

However, after taking the prior art into consideration, it became apparent that the matters(G) were mentioned in a document JP 2000-340403 A (SEIKO EPSON KABUSHIKI KAISHA), 2000.12.08, the whole document, figs. 1-7 and EP 1304186 A2 (SEMICONDUCTOR ENERGY LABORATORY CO., LTD.), 2003.04.23, the whole document, figs. 1-28. Therefore, the matters(G) makes no contribution over the prior art.

Consequently, there is no same or corresponding "special technical features" which is the expression in the PCT Rule 13.2. Therefore, there is no technical relationship between the inventions of claims Nos. [40, 41], [42, 43], [44], [45], [46], [47] and [48].

Consequently, there is no same or corresponding "special technical features" which is the expression in the PCT Rule 13.2. Therefore, there is no technical relationship between the inventions of claims Nos. [1, 2], [3], [4], [5], [6, 7], [8], [9], [10], [11], [12], [13, 14], [15, 16], [17], [18], [19], [20], [21], [22, 23], [24, 25], [26], [27], [28], [29], [30], [31, 32], [33, 34], [35], [36], [37], [38], [39], [40, 41], [42, 43], [44], [45], [46], [47] and [48].